

REMARKS

The application has been amended and is believed to be in condition for allowance.

Claims 6 and 7 were objected to. The claims have been amended to remedy the stated bases of objection. Withdrawal of the objection is solicited. Claims 1 and 20 were also amended to address formal matters.

Claims 1-5, 8, 10 and 12-32 were rejected under section 102 as anticipated by SUZUSHI 2002/0110651.

Claims 6 and 7 were rejected under section 103 as obvious in further view of NIKOLOV 2004/0095637.

Claim 9 was rejected under section 103 as obvious in further view of the Admitted Prior Art.

Claim 11 was rejected under section 103 as obvious over SUZUSHI alone.

Claims 1 and 21 are independent. Each of these claims is believed patentable. The dependent claims are believed patentable at least for depending from an allowable claim.

The present invention is an optical device having encoded therein at least two different types of optical image. This is recited in claim 1 as i) an encoding surface having a micro-relief pattern over at least part thereof, and ii) an optically anisotropic layer. Claim 1 further recites that the micro-relief pattern produces a predetermined diffracted first

image when illuminated and that at least part of the micro-relief pattern induces local orientation of the optically anisotropic layer thereby to impose a predetermined polarization modulation, thereby to produce a predetermined second image when illuminated in use.

None of the applied references makes this disclosure.

In the invention, the images are of different types, i.e., a polarized image and a diffracted image. The claim requires that both images be induced, at least in part, by the micro-relief pattern.

Thus, in the invention the micro-relief pattern not only generates a diffracted image but also, through the optically anisotropic layer, a polarized image.

SUZUSHI does not disclose such a structure. Nor has the Official Action identified any disclosure of SUZUSHI that discloses the recited elements of the claimed invention.

As to claim 1, the Official Action only points to SUZUSHI paragraph 0026 which discloses: [0026] The cholesteric liquid crystal film used for forming the cholesteric liquid crystal layer has a region exhibiting diffractivity partially or entirely in the second dimension direction, i.e., surface direction. When the film has a region exhibiting diffractivity partially in the second dimension direction, no particular limitation is imposed on the number of the region and all the regions are not required to exhibit the mutually same

diffractivity. When the film has a region exhibiting diffractivity entirely in the second dimension direction, the diffraction power may not be uniform. The region exhibiting diffractivity partially or entirely in the second dimension direction may be present on either or both of the surface layers viewing from the film thickness direction or may be present inside the film.

There is no disclosure contained therein of the recited micro-relief pattern that performs the recited dual function. Thus, there is no anticipation of the recited invention.

In SUZUSHI, the cholesteric liquid crystal material is first formed to have the polarisation qualities by virtue of its cholesteric structure and thereafter a region of diffractivity is imposed. There is no suggestion of the synergistic effect of providing a micro-relief pattern which both creates a diffracted image and also induces orientation of the optically anisotropic material to provide a polarised image.

In SUZUSHI the adhesive layer in the structure as clearly described in paragraphs [011] to [021] does not have a micro-relief pattern. All the diffraction is due to the cholesteric material, in other words there is no underlying diffractive pattern in the adhesive layer. Also, in [021] it is suggested to use curtain or spray coating to make the adhesive layer and neither of these processes can result in a predetermined periodic micro-relief pattern of the type required

for the present invention. Furthermore, in paragraphs [024] to [026] it indicates that diffraction is done by the cholesteric layer with the thickness specific for constructive interference. This means, as is intrinsic for cholesterics, that the hologram is a reflective hologram, with the iso-phase surfaces oriented substantially parallel to the substrate. In the present case, the hologram is always of a transmission type, even if it operates in reflection; the iso-phase surfaces are perpendicular or at an angle to the underlying structure. Also, because the hologram is a reflective hologram, a diffractive aligning surface under the cholesteric material cannot produce any noticeable diffraction since all the light is reflected back by the top layer by the diffraction of cholesteric. In brief, light incident from the cholesteric side is reflected by diffraction, only the zero order components could pass through to the adhesive layer, and there is nothing there to redirect it in the same direction as diffraction from the cholesteric.

Furthermore, the circular polarisation of the light reflected by a cholesteric liquid crystal does not depend on the direction of the alignment. It will always produce the same circular polarisation and hence it is not possible to encode any information.

As noted previously, the grating aligning surface cannot diffract in the same direction as the cholesteric material (e.g. in reflection) because it is under the cholesteric mirror.

Furthermore, at a more general level, SUZUSHI is not concerned with impressing information upon a polarisation image but instead is designed to provide a uniform polarisation pattern so that the reflected beam is both diffracted and uniformly polarised, whereas in the present invention there are two separate effects.

In conclusion, the invention as claimed is fully patentably distinguished from SUZUSHI because, in the present invention, the micro-relief pattern has the dual effect of both diffracting the light to produce a diffraction image and also of inducing local orientation of the anisotropic material to provide a polarised image. These two images are separate whereas in SUZUSHI there is provide a cholesteric material which already has polarisation modulation properties in it and there is then a diffraction grating provided to form a complementary diffraction grating on the cholesteric material. Because the cholesteric liquid crystal material has already been produced and fixed by the time this is applied, the diffraction surface applied after formation of the cholesteric liquid material has just one function and that is to provide diffraction.

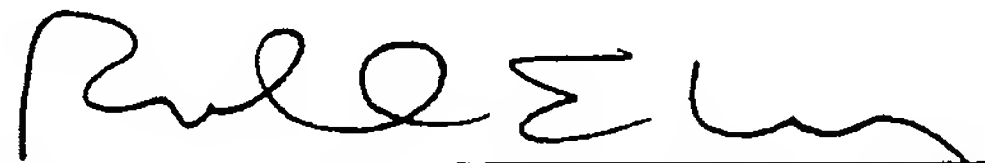
As SUZUSHI, as well as the other applied references, do not teach or suggest the claimed invention, the claims are all believed patentable. Reconsideration and allowance of all the claims are respectfully requested.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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